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The impact of volatile crude oil prices on M&A in the oil industry

Utjecaj volatilnosti cijene sirove nafte na spajanja i preuzimanja u naftnoj industriji

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Abstract

The aim of this paper is to perform statistical analyses and identify the impact of volatility in crude oil prices with respect to the value and number of M&A in the oil industry and to identify the extent to which M&A market lags in responding to changing oil prices. Given the limited public access to data on M&A in the oil industry, the study focused on the upstream and global oil industry in general. Nonetheless, the results of the study remain indicative. Ongoing future research should also research other business segments to measure the exposure of oil industry segments to changing oil prices.

Keywords: oil industry, M&A, volatility of crude oil prices, exposure rates

JEL classification: D4, L1

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Saželak

Cilj ovog rada je izraditi statističke analize i utvrditi utjecaj volatilnosti cijena sirove nafte s obzirom na vrijednosti u industriji nafte i identificirati mjeru u kojoj tržište stjecanja i preuzimanja zaostaje u reagiranju na promjene cijene nafte. S obzirom na ograničen pristup javnosti podacima o stjecanju i preuzimanju u naftnoj industriji, studija je usmjerena na djelatnost geološkog istraživanja i proizvodnje te globalnu naftnu industriju u cjelini. Ipak, rezultati istraživanja ostaju indikativni. Budućim se istraživanjima također trebaju istražiti drugi poslovni segmenti u svrhu mjerenja izloženosti naftnih gospodarskih grana na volatilnost cijene nafte.

Ključne riječi: naftna industrija, stjecanje i preuzimanje, volatilnost cijene nafte, stopa izloženosti

JEL klasifikacija: D4, L1

1. Introduction

Led by the oil industry, the energy industry as a whole retained its primary position across the world in terms of the total value of M&A with $640 billion worth of transactions in 2015.

This paper focuses on the volatility of oil prices as an indirect factor affecting M&A. The oil industry is characterised by high volatility in crude oil prices. Oil is a classic homogeneous global commodity and is sold for the same price everywhere in the world given that oil transportation by tankers is a low-cost factor, thus making it a globally comparable commodity. This is not the case for gas prices which vary from region to region as gas is transported via pipelines at a cost that varies regionally.

More activity on the M&A market is expected due to the fall in oil prices, however the opposite is also true. During the period in which high prices were

expected to be maintained, companies invested in riskier projects such as fracking in the US, drilling in the North Sea, the Arctic and the deep sea where drilling costs are high. Consequently, oil prices should remain relatively high for oil investments to be worthwhile. Due to lower demand, debts and lower revenues, upstream companies, primarily those that have entered risky projects, are seeking solutions to their difficulties on the M&A market. On the other hand, low oil prices create a positive external environment for downstream companies and, with the fall of oil prices, oil refining margins and revenues in downstream are rising. Most of the oil companies in the world have an integrated structure where such relations are in conflict.

The main motives in the oil industry for M&A are: increasing their own oil and gas reserves due to the growing scarcity of energy resources; maintaining the benefits and balance of their portfolio that includes both downstream and upstream operations; reducing the risk of fluctuating oil prices through vertically integrated business operations; and the privatisation of national oil companies. Other motives include the synergistic effects of cost reductions in terms of reduced profitability; abandonment of used and costly burdened areas of Europe and North America, while moving to cheaper and more promising areas in the world that have become accessible due to globalisation; increasing productivity while reducing costs with the aim of increasing the efficiency and competitiveness of domestic and foreign markets; increasing technological levels of exploitation, production, oil refining compliance with increasingly harsh regulatory criteria; portfolio optimisation and putting a focus on the core business (Rajaković, 2005).

Integrated oil companies usually comprise two main segments: upstream and downstream. The upstream sector typically includes companies that search for underground or underwater crude oil and natural gas fields, as well as drill, operate wells and bring natural gas to the surface. The downstream sector is involved in the processing and sale of petroleum products. There is also the midstream sector that is involved in the transportation, storage and marketing of oil.

The upstream earns money by selling crude oil. In turn, this represents a cost to the downstream sector when making purchases, hence oil prices affect those two business divisions in different ways. Upstream companies are particularly sensitive to the level of changes in oil prices which often follows a trend, whereas the value of downstream company shares move in the opposite direction to that of oil prices. Integrated companies respond differently as their earnings come from both types of activities. Hence, integrated companies have higher profits than upstream and lower downstream companies when oil prices rise, whereas the opposite is also true (Garcia, 2016).

Large integrated oil companies are less exposed to changes in oil prices due to a high degree of vertical integration and a high level of solvency. The degree of exposure to risk depends on the level of vertical integration, and not the size of the company. Large companies, on average, have a higher share of downstream operations compared to small companies. These smaller companies usually focus on upstream business due to their limited capital and therefore investing in specific segments of the value chain is more profitable. Revenue from downstream activities is very important for an integrated company as it ensures stable income and a degree of protection (Davis, 2006).

Price volatility is defined as the standard deviation of a series of price changes measured at regular intervals. Market prices and activity in the M&A are correlated so that the growth of oil prices slows activity in the M&A market, and vice versa, a decline in oil prices boosts activity in the M&A market. Due to the current waiting game, oil prices will unlikely make an immediate impact on decisions regarding M&A given that basically all finalised M&A transactions are prepared months in advance. Although simply securing financial leverage for new energy affairs is not expected, the general rule is to temporarily put off at least one quarter of M&A deals to determine possible macro impacts on new ones. For instance, the impact of a drop in oil prices during the last quarter of 2016 will be noticeable in the first or second quarters of next year even if oil price rise in those quarters.

Besides oil prices, another significant issue for business operations is lower oil prices leading to a decrease in value. Numerous companies face lower asset values in periods when oil prices fall. Given

that companies anticipate growth in oil prices, sales of such assets are irrational during troughs in oils. On the other hand, buyers find no justification in acquiring assets at their current reduced prices as they anticipate a continuing downward trend in oil prices, and with it additional declines in the value of such assets.

During times of low oil prices, smaller investments by the upstream companies are expected, along with possible consolidation of services relating to oil wells. In recent years, a large number of upstream companies were established for fracking activities, with the owners of these companies receiving incentives for acquiring land mainly in peripheral areas, where drilling pays off only when oil prices are relative high. These companies are ready to accept discount deals on the M&A market due to their burden of serious debt (Primack, 2014).

Another argument is that a fall in oil price creates a slowdown in the M&A market. When oil prices fall rapidly, companies tend to focus on reducing internal costs and improving productivity instead of engaging in M&A as a tool for growth.

2. Setting up hypotheses

As previously mentioned, there are various approaches to the issue of establishing a correlation between changing oil prices and the value of M&A transactions. Some proponents uphold that the M&A market reacts positively to falling crude oil prices by increasing the volume and value of transactions, whereas others that a decline in oil prices creates a downturn in the M&A market.

This paper presents the opinion that a drop in oil prices mostly affects companies in the upstream sector. Upstream companies are leading with M&A transactions in oil industry on average with 70% of the total volume and in excess of 50% of the total value.

The period of a dip in oil prices is when private equity companies are most active, taking advantage of the fact that most companies engaged solely in the exploration and production of oil are those in crisis. As an example, after oil prices almost halved at the end of 2014, Stephen Schwarzman, the executive director in one of the largest private equity companies, said it was a great opportunity (Fugazy, 2015).

The fall in oil prices negatively affects the value of upstream companies and related service companies, and most adopt a strategy of continuing to take on loans on the basis of production reserves where such loans enable upstream companies to continue drilling for oil. The funds are usually provided by banks subject to reduced production and declining oil prices. Less available financial resources allow companies in the upstream business to focus solely on their core business. The issue of negative cash flow due to declining oil prices is offset by selling off non-core assets and using the capital to continue delivering main strategies (Fugazy, 2015).

Due to oversupplies in the market and the subsequent decline in oil prices, companies focus less on upstream drilling, have less disposal income whereas their liabilities remain the same, resulting in numerous companies from other business areas taking advantage of the cash starved upstream sector. Subsequently, a lot of companies in the upstream sector face difficulties in financing their operations, and therefore are more open to M&A in order to attract additional financing and capital. The small remnant of upstream companies not facing cash flow problems will benefit from the crisis in the market and merge with those companies experiencing a financial crisis.

The most vulnerable companies in the upstream sector are relatively small companies and those that have focused their business on offshore wells and shale oil extraction, where such activities by their very nature incur exceptionally higher extraction costs and therefore do not suffer from low crude oil prices. According to data from OPEC, the cost of shale oil production, which is extremely popular in the United States, is in the range of 30 USD/bbl to 60 USD/bbl or more. For the sake of comparison, the cost of extracting oil in Saudi Arabia is 10 USD/bbl and less.

A fall in oil prices is not always incentive for undertaking M&A, but may also be a burden. Miguel Azevado, an investment banker for Citigroup Africa, stated that relaunching M&A activities after the decline of oil prices will take a few months. The prevailing view is that M&A transactions commence only after oil prices cease to fall and have reached a trough, as investors lack the courage to make acquisitions, nor do banks and other investors provide fi-

nance prior to reaching that trough (Thomas, 2015).

Volatile oil prices also affect large companies that cease disinvestment programmes until a certain oil price allows them to gain the estimated value of their assets.

It is difficult to assert whether a fall in oil prices causes larger or smaller numbers of M&A transactions. For example, the years 2008 and 2014 saw a significant drop in oil prices, with a non-uniform impact on the industry. In 2008, all industries were at the receiving end of the global crisis, especially the real estate market in the United States and the global banking sector. In 2014, despite the fall in oil prices, most industries across the world grew, with the fall in oil prices affecting mainly companies in the oil industry, an industry subject to greater scrutiny from regulators and governments, meaning that banks were more cautious in financing ailing industries than in 2008.

The aim of this study is to establish a relationship between changes in oil prices and the volume, value and average value of M&A transactions with an emphasis on upstream sector as the main generator of transactions in the oil industry. This research endeavours to establish a link between these factors and the oil prices in the observed period, including changes in oil prices with respect to the previous period, i.e. the declining or increasing oil prices in the observed period as a relevant factor in forming future expectations of both investors and company owners.

Furthermore, the question remains as to what period does the market react in terms of changing oil prices. Given that M&A are a complex process for both parties, the topic will not be addressed superficially. Even after a decision on commencing a M&A transaction has been made, it takes time to execute. This study endeavours to show how many quarters of delay the quarterly change in price and average quarterly price of oil is reflected in number and value of M&A transactions.

The hypotheses are defined as followed:

H1: The price of oil affects the volume and value of M&A transactions in the upstream sector (E&P)

H2: Changes in oil prices affect the volume and value of M&A transactions in the upstream sector (E&P)

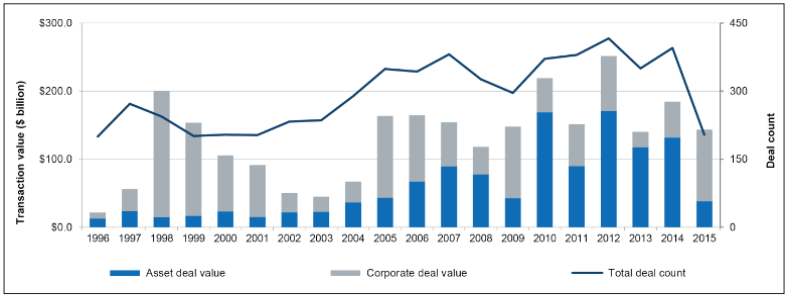
H3: Oil prices have a delayed effect on the value of M&A transactions in the oil industry

H4: The difference in oil prices has a delayed effect on the value of M&A transactions in the oil the industry.

3. Methodology and results of the research

The first part of the research focuses on the link between M&A transaction volumes and values along with average annual Brent prices and Brent price changes relative to the previous period. Observations focused on the upstream sector as it is the main generator of M&A in the industry, and the fact that it is the sector of the oil industry more sensitive to crude oil prices and highly exposed to the risk of volatile oil prices. These variables were

Figure 1 Volume and value ratio of M&A transactions in upstream from 1996 to 2015



Source: IHS Markit.

Table 1 Correlation of volume and value of M&A transactions to crude oil prices and price changes (1996-2015)

	Correlation of the variables	Valid N	Spearman R	t(N-2)	p-value*
-1Y	Number of M & A transactions and Brent price	20	0,8354	6,4485	0,0000
	The value of M & A transactions and Brent price	20	0,4657	2,2328	0,0385
	Number of M & A transactions and Brent price change	20	0,2373	1,0363	0,3138
	The value of M & A transactions and Brent price change	20	0,0693	0,2949	0,7715
-1Y	Number of M & A transactions and Brent price	20	0,7217	4,4229	0,0003
	The value of M & A transactions and Brent price	20	0,4371	2,0617	0,0540
	Number of M & A transactions and Brent price change	20	0,3849	1,7695	0,0938
	The value of M & A transactions and Brent price change	20	0,0934	0,9819	0,6951

Source: the authors.
*marked correlations are significant at p<0.05

observed on an annual basis from 1996 to 2015. The data includes acquisitions, swaps, mergers, joint ventures with disclosed values greater or equal to 10 million USD. Brent is used in research as a reference value of oil given that 2/3 of all contracts in the world are linked to it and is the most widely used oil marker. Annual averages for Brent quotations were used.

Statistical analysis of the variables for 20 periods from 1996 to 2015 provided the following results.

Spearman correlation coefficient with a significance level of 5% indicates there is a very strong positive linear correlation between the number of M&A transactions in the upstream and the Brent price. Using the same level of significance, a moderate positive correlation was determined between the value of M&A transactions in the upstream sector and the Brent price (rs=0.4657, n=20, p=0.03585). H1 was accepted with a significance level of 5%, meaning that oil prices affect M&A transaction values and volumes in upstream sector. Based on this finding, an increase in Brent price in the current year coincides with the upstream market reacting by increasing transaction numbers and increase the total value of all transactions but to a somewhat lesser degree. The specified correlations are shown graphically below on a scatter diagram.

There was no statistically significant correlation determined between the volume and value of M&A upstream transaction and annual Brent price changes in the observed period when compared to last year's average price of Brent. With a 5% significance level, the assumption that oil price changes affect the volume and value of M&A transactions in the upstream can be rejected.

Further research focused on finding a correlation between the volume and value of M&A transactions and the Brent price of the previous year.

A statistical analysis of the observed variables, i.e. M&A transaction values and volumes across 20 periods (1996-2015) and oil prices for the period 1995-2014, provided the following results.

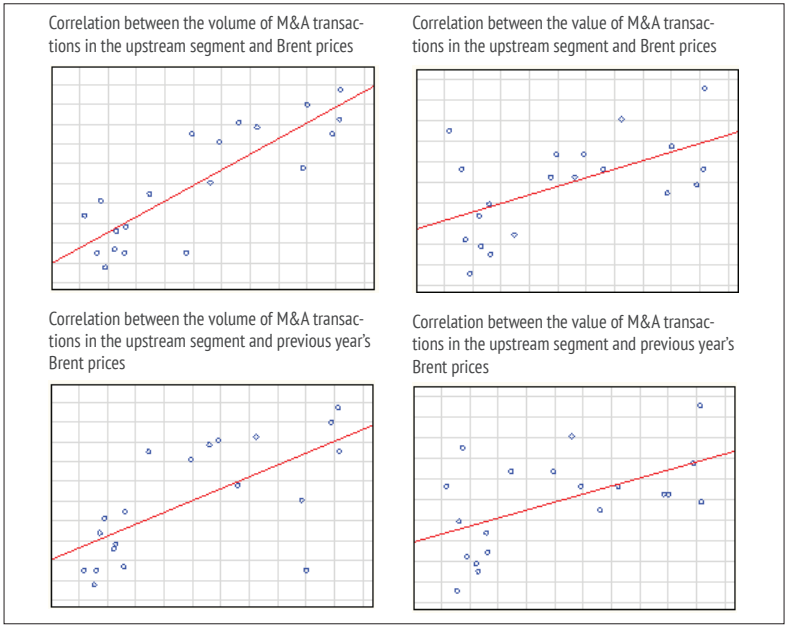
A significance level of 5% indicates a strong positive correlation between the M&A transaction volume in the upstream segment and the Brent price in the previous year (r_s = 0.7217, n=20, p=0.0003). The same level of significance highlighted a moderate positive correlation between the M&A transaction value in the upstream segment and the price for Brent in the previous year (r_s=0.4371, n=20, p=0.0540).

The higher price for Brent in the previous year led to an increase in M&A transaction volumes and values in the current year, indicating therefore that the M&A market responds with a one-year delay to the price of Brent. Statistical analysis may provide an indication of market sluggishness by determining the number of quarters reacting with a delay to the price of Brent.

The following part of the research determined the size of lag in which the market reacts to changes in the Brent price. The quarterly values of the variables for the period from 2009 to 2013 were observed. Data on the volume, value and average value of M&A transactions was taken from the annual publications of Ernst & Young's *Global oil and gas transaction review* from 2009 to 2015 and PWC's annual publication *O&G Deals Mergers and activity within the global oil and gas market* from 2007 to 2009, *Oil and Gas global deals six months ending 31 December 2013*. Brent quotation quarterly averages were used for the price of Brent.

The determined correlation between the volume,

Figure 2 Correlation of the volume and value of M & A transactions in the upstream segment and the Brent price of the current and previous year



Source: the authors.

value, average value of M&A transactions and quarterly prices and price changes for Brent indicates a sluggish market with a delayed reaction. This was the expected result as almost every transaction is prepared months in advance to its closing.

Further research revealed a correlation between the M&A transaction volumes and transactions with the price of Brent dated three quarters prior to the observed period.

Statistical analysis of the variables for 20 periods from the first quarter of 2009 to the fourth quarter of 2013 provided the following results.

A significance level of 5% showed a moderate positive correlation between the total value of M&A transactions and changes in the average price of Brent from the previous quarter. The relation of the observed variables and changes in the Brent price is a lag of three quarters (r_s=0.4496, n=20, p=0.0467). The same level of significance provided a moderate positive correlation between the average value of M&A transactions and changes in the Brent price from the previous quarter, where the price change refers to a period of three quarters prior to the researched period (r_s=0.5791, n=20, p=0.0075).

A positive change in oil prices (an increase in one quarter compared to the previous quarter) leads to an increase in total and average value of M&A transactions in the oil industry, subject to a delay of three quarters. For example, a rise in oil prices from the fourth to the subsequent first quarter also leads to an increase in the total value of M&A transactions within the oil industry. The same correlation exists for the average M&A transaction value increasing a slightly smaller percentage over the total transaction value and subject to the same increase in the price of Brent.

These results support the theory that declining oil prices, not just absolute oil prices, lead to a reduction of activity in the oil market and vice versa. Many

Table 2 The correlation between the number of variables, values and average value of M&A transactions to prices and the price changes for Brent at a quarterly level

	Correlation of the variables	Valid N	Spearman R	t(N-2)	p-value*
	The volume of M & A transactions and Brent price	20	-0,1250	-0,5347	0,5994
	The value of M & A transactions and Brent price	20	-0,0421	-0,1787	0,8600
	The average value of M & A transactions and Brent price	20	-0,0512	-0,2175	0,8302
	The volume of M & A transactions and Brent price change	20	0,1589	0,6830	0,5033
	The value of M & A transactions and Brent price change	20	-0,0767	-0,3263	0,7479
	The average value of M & A transactions and Brent price change	20	-0,1047	-0,4465	0,6605
-1Q	The volume of M & A transactions and Brent price	20	-0,1913	-0,8271	0,4190
	The value of M & A transactions and Brent price	20	-0,0857	-0,3650	0,7194
	The average value of M & A transactions and Brent price	20	-0,0873	-0,3720	0,7142
	The volume of M & A transactions and Brent price change	20	-0,0105	-0,0447	0,9648
	The value of M & A transactions and Brent price change	20	-0,2045	-0,8864	0,3871
	The average value of M & A transactions and Brent price change	20	-0,2794	-1,2344	0,2329
-2Q	The volume of M & A transactions and Brent price	20	-0,2064	-0,8950	0,3826
	The value of M & A transactions and Brent price	20	-0,0060	-0,0255	0,9799
	The average value of M & A transactions and Brent price	20	0,0783	0,3333	0,7428
	The volume of M & A transactions and Brent price change	20	0,1130	0,4825	0,6353
	The value of M & A transactions and Brent price change	20	0,3895	1,7941	0,0896
	The average value of M & A transactions and Brent price change	20	0,2492	1,0919	0,2893
-3Q	The volume of M & A transactions and Brent price	20	0,2561	-1,1241	0,2757
	The value of M & A transactions and Brent price	20	-0,1850	-0,7985	0,4350
	The average value of M & A transactions and Brent price	20	-0,0535	-0,2272	0,8229
	The volume of M & A transactions and Brent price change	20	-0,2983	-1,3260	0,2014
	The value of M & A transactions and Brent price change	20	0,4496	2,1356	0,0467
	The average value of M & A transactions and Brent price change	20	0,5791	3,0134	0,0075
-4Q(1Y)	The volume of M & A transactions and Brent price	20	0,0195	0,0830	0,9340
	The value of M & A transactions and Brent price	20	-0,6030	-3,2070	0,0040
	The average value of M & A transactions and Brent price	20	-0,5422	-2,7375	0,0135
	The volume of M & A transactions and Brent price change	20	-0,2282	-0,9946	0,3331
	The value of M & A transactions and Brent price change	20	-0,0195	-0,0830	0,9348
	The average value of M & A transactions and Brent price change	20	0,0211	0,0895	0,9297

Source: the authors.
*marked correlations are significant at p<0.05

companies, even if not feeling directly threatened, will not favour reduced asset values as opposed to achievable asset values prior to declining price due to a belief that oil prices will eventually recover and that selling assets during low oil prices seems irrational. On the other hand, investors believe that oil prices will continue their current trend and therefore the asset prices will fall even more, making the such acquisitions irrational. This behaviour by investors and sellers causes the market to slow down when oil prices are falling, and vice versa.

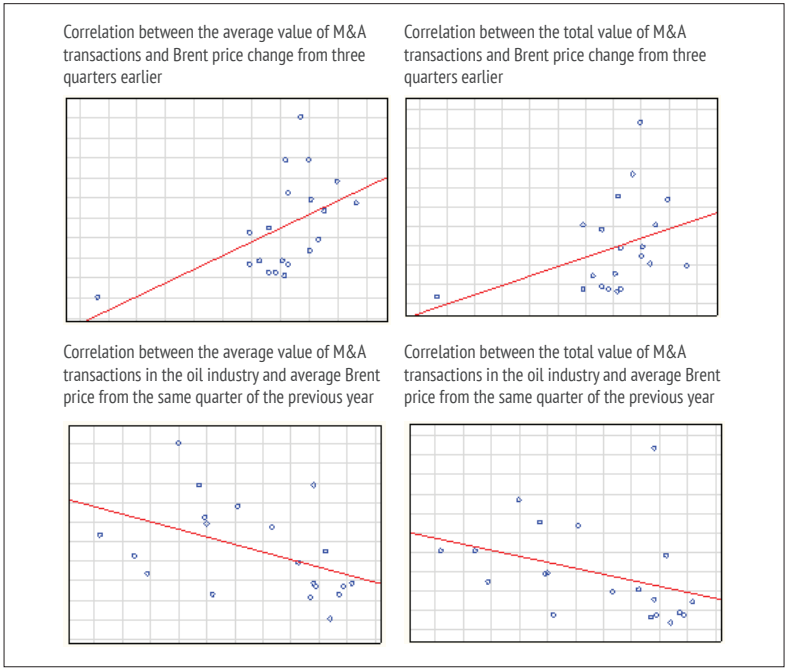
Statistical analysis of the variables across 20 periods from the first quarter of 2009 to the fourth quarter of 2013 gave the following results.

A significance level of 5% indicates a strong negative correlation between total value of M&A transactions and the average quarterly price of Brent from an earlier period of four quarters (r_s=-0.6030, n=20, p=0.0040). The same level of significance suggested a moderate negative correlation between the average value of M&A transactions and the average quarterly price of Brent for the same period of the previous year (r_s=-0.5422, n=20, p=0.0135).

A higher price of Brent leads to a lower total value and average value of M&A transactions in the oil industry. This indicates a different trend than in upstream given that the data includes upstream, downstream and midstream segments which, as previously stated, react to increasing prices opposite to that of the upstream segment. There is no statistically relevant link between observed variables for the price of Brent in the current quarter and two previous quarters. Moreover, there is no statistically significant correlation between the volume of transactions to prices and price changes for Brent in any of the observed periods.

Finally, hypotheses H3 and H4 may be accepted for a significance level of 5%, in other words, oil prices and oil price changes do affect the value of M&A transactions in the oil industry subject to a delay of three or four quarters.

Figure 3 Correlation of total and average value of M&A transactions with the absolute Brent price and Brent price change experiencing a lag



Source: the authors.

4. Conclusion

Over the short term, prices are driven by supply and demand in a way that if oil supply exceeds demand on the market, prices fall, whereas no oil shortages on the market lead to price rises. Geopolitical events such as wars, riots and other uncertainties affect the major oil producers because such events can bring oil producing and selling countries to a standstill, thus reducing the supply of oil in the market. Furthermore, economic growth coincides with growth in demand for oil, possibly leading to oil shortages. Equally so, global economic slowdown leads to excess oil supplies on the market and consequently lower prices. The final oil price is also affected by the futures market, transport availability and costs, exchange rates (primarily the US dollar), costs of labour and equipment for oil extraction. Oil prices affect strategies adopted by oil companies, and therefore their decisions on M&A. The basic premise is the existence of a correlation between market prices of oil and M&A activities such that decreasing oil prices slow down, whereas increasing oil prices boost M&A activities in the industry. Upstream companies prefer higher oil prices and therefore they may be more exposed to M&A when their businesses are threatened by lower oil prices, with the reverse being true for downstream companies. The downstream segment uses crude oil as an input and, consequently, benefits more from lower oil prices thus achieving higher refining margins. Most modern companies are vertically integrated including upstream, downstream, midstream and service companies. Therefore, a rise or fall in oil prices for such diversified businesses is not necessarily neither a good or bad thing. The financial results of most companies is mainly impacted by the upstream segment due to it having the high-

est margins in the industry. Our research observed volume, value and average values of M&A in the oil industry while focusing on the upstream segment as being most important representative in terms of correlation to oil prices and the oil price changes. The upstream segment is exceptionally exposed to oil prices and traditionally holds the largest share in the total volume and value of M&A transactions in the oil industry. Statistical analysis has confirmed a positive correlation between the volume and value M&A transactions to the price of Brent, meaning that increasing prices for Brent results are increasing in volumes and values of M&A transactions in the upstream segment. The upstream market reacts less to the changes in the price of Brent from previous periods (years) indicating the same direction of correlation which in turn can be explained by the sluggishness of the M&A market given that decisions on M&A transactions are not made hastily, and if management does make such decisions, preparing an M&A transaction takes time. Research has found a negative correlation between the value and average value of total M&A transactions in the oil market to oil prices and oil price changes with a delay of four quarters. A positive correlation between transaction values and oil prices was found for upstream when compared to the entire oil industry, which can be explained by the significant contribution to the value of transactions in the respective period by downstream and midstream segments. Moreover, the value of upstream companies entering M&A processes falls during periods of low oil prices, which may also partly explain this result. A positive correlation between oil price changes, the value and average value of transactions exists for a three-quarter lag. Accordingly, the M&A market reacts to price changes spanning from third to fourth quarter where the negative correlation for oil prices to the observed variables is pre-determined. The fall or rise in oil prices, irrespective of the absolute rate, is therefore an important factor because the M&A market slows or gains momentum given its dependency on oil prices. A larger sample and observation period would be required for ongoing research. Research should be expanded by observing each business segment separately (upstream, downstream, midstream, services) in order to determine the manner in which each segment contributes to the total volume and value of M&A transactions in the oil industry and to determine the correlation between them and the correlation of each segment to the oil industry in general and that of integrated companies.

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